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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/620,560	07/17/2003	Ming-Chi Liaw	MERCK-1923D1	9252
23599	7590	02/23/2006	EXAMINER	
MILLEN, WHITE, ZELANO & BRANIGAN, P.C. 2200 CLARENDON BLVD. SUITE 1400 ARLINGTON, VA 22201			OLSEN, ALLAN W	
			ART UNIT	PAPER NUMBER
			1763	

DATE MAILED: 02/23/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/620,560

Applicant(s)

LIAW ET AL.

Examiner

Allan Olsen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 December 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 13-21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 13-21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 17 July 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☒ Certified copies of the priority documents have been received in Application No. 01/151,181.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on December 12, 2005 has been entered.

Claim Objections

Claims 1, 20 and 21 are objected to because they each still include the word "drywall". Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 13-21 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claims contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventors, at the time the application was filed, had possession of the claimed invention. Claim 1 recites a weight ratio between sulfuric acid and one of hydrofluoric acid (i.e., an aqueous solution of hydrogen fluoride), ammonium fluoride or an alkali metal fluoride. The specification discloses (page 3, line 31 - page 4, line 8) a weight ratio between sulfuric acid and a fluorine-containing

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compound composed of a fluoride ion and a mono-charged cation. Hydrogen fluoride (i.e., an anhydrous gaseous compound) is explicitly identified as one example of the fluorine-containing compound. The specification teaches that hydrofluoric acid is the source for hydrogen fluoride. The specification discloses using commercially available sulfuric acid, H_2SO_4 (96%) and hydrofluoric acid, HF (49%). The weight ratio discussed in the specification appears to be a ratio between sulfuric acid (i.e., 96 % H_2SO_4) and the compound hydrogen fluoride. Claim 13 is now directed to a composition with specified range for a weight ratio between sulfuric acid and hydrofluoric acid (i.e., 49 % HF).

Claim 21 is directed to a composition with a 3:1 ratio between the volume of sulfuric acid to the combined volume of hydrofluoric acid and hydrogen peroxide (H_2SO_4 : (HF + H_2O_2)). However the specification discloses mixing hydrofluoric acid with sulfuric acid and then adding this mixture to H_2O_2 such that the ratio between the volume of (H_2SO_4 + HF) to the volume of H_2O_2 is 3:1 (see page 6, lines 1-2).

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

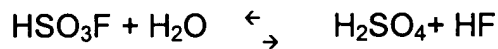
(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 13, 15, 16 and 18-20 are rejected under 35 U.S.C. 102(b) as being anticipated by Ohnishi et al. in EP 0618612A2 (hereinafter, Ohnishi) or, in the alternative, under 35 U.S.C. 103(a) as obvious over Ohnishi.

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Ohnishi teaches removing organic and inorganic sidewall residue after the plasma etching of a substrate through a photoresist mask (figure 7a). Ohnishi teaches using a solution comprising H_2SO_4 , H_2O_2 and an HF generating fluorine-containing compound, for example, HSO_3F . Ohnishi discloses preferred embodiments and comparative examples wherein the volume percentage of HSO_3F ranges from .005 % to 7.5 %. This rejection is made in the 102/103 alternative for several reasons¹. Ohnishi does not explicitly teach the amount of HF that is produced in solutions. However, the examiner believes that within the HSO_3F concentration range taught by Ohnishi, the claimed weight ratio between sulfuric acid and hydrofluoric acid would inherently be present. Ohnishi teaches conducting a 5-10 minute cleaning process while maintaining the temperature between 80° and 130° C (column 8, lines 5-13).

With respect to the "consisting essentially of" claim language, the examiner notes Ohnishi discloses the following reaction:



Quite significantly, this represents the establishment of equilibrium. In view of the ready interconversion/coexistence of HSO_3F and $(\text{H}_2\text{SO}_4 + \text{HF})$, and in view of the fact that applicant and Ohnishi use their respective compositions for the same purpose, the examiner does not believe HSO_3F can be considered to be a substance that materially affects "the basic and novel characteristic(s)" of the claimed invention.

Additionally, Ohnishi provides a comparative example wherein 1 % hydrofluoric acid is added to a 5:1 mixture of H_2SO_4 and H_2O_2 . If one reasonably assumes that

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Ohnishi is using standard hydrofluoric acid (i.e., 49 % HF), this composition would have an HF (i.e., hydrogen fluoride to sulfuric acid weight ratio of ~ 300:1 and a sulfuric acid to hydrofluoric acid weight ratio of ~150:1.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 14, 17 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ohnishi.

The above noted teachings of Ohnishi are herein relied upon.

Ohnishi does not teach:

1. the type of photoresist resist as being one of a g-line, i-line, Deep-UV, e-beam or X-ray;
2. removing photoresist while the operation pressure is maintained at 1 atm;
3. an H_2SO_4 : ($\text{HF} + \text{H}_2\text{O}_2$) ratio of 3:1.

It would have been obvious to one skilled in the art to apply the method of Ohnishi to one of a g-line, i-line, Deep-UV, e-beam or X-ray photoresist because

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Ohnishi is directed to the removal of a generic photoresist and the types of photoresist recited in claim 14 include the most common types of photoresist that were use at the time of Ohnishi's disclosure.

It would have been obvious to one skilled in the art to carry out the method of Ohnishi while maintaining a pressure of 1 atm because when a reference is completely silent on a parameter such as pressure, the skilled artisan would assume that the ambient pressure is used. If Ohnishi intended the method to be carried out at anything other than 1 atm the skilled artisan would expected that this to be disclosed. In the absence of such a discloser it would be obvious to operate at a pressure of 1 atm.

It would have been obvious to one skilled in the art to optimize the process with regard to the ratio of the components in the cleaning solution because Ohnishi teaches that a composition ratio is a cause-effective variable.

"Normally, it is to be expected that a change in temperature, or in concentration, or in both, would be an unpatentable modification. Under some circumstances, however, changes such as these may impart patentability to a process if the particular ranges claimed produce a new and unexpected result which is different in kind and not merely degree from the results of the prior art... such ranges are termed "critical ranges and the applicant has the burden of proving such criticality... More particularly, where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation."

In re Aller 105 USPQ 233, 255 (CCPA 1955). See also *In re Waite* 77 USPQ 586 (CCPA 1948); *In re Scherl* 70 USPQ 204 (CCPA 1946); *In re Irmischer* 66 USPQ 314 (CCPA 1945); *In re Norman* 66 USPQ 308 (CCPA 1945); *In re Swenson* 56 USPQ 372 (CCPA 1942); *In re Sola* 25 USPQ 433 (CCPA 1935); *In re Dreyfus* 24 USPQ 52 (CCPA 1934).

Additionally, concentration limitations are obvious absent a showing of criticality.

Akzo v. E.I. du Pont de Nemours 1 USPQ 2d 1704 (Fed. Cir. 1987).

Response to Arguments

Applicant's arguments filed October 12, 2005 have been fully considered but they are not persuasive. Applicant argues that Ohnishi "teaches away" from the claimed invention because Ohnishi teaches using HSO_3F instead of HF whereas applicant's claimed invention does use HF.

In response, it is noted that Ohnishi uses HSO_3F for the express purpose of generating HF. Furthermore, Ohnishi recognizes that HF is essential to achieve the desired etching/cleaning results. Rather than teaching away from using HF, Ohnishi teaches an alternative means by which HF can be supplied to the process.


Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Allan Olsen whose telephone number is 571-272-1441. The examiner can normally be reached on M-F 1-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on 571-272-1435. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

 Allan Olsen
Primary Examiner
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ⁱ Example of circumstances when an alternative 102/103 rejections is appropriate:

- a. When the reference discloses all the limitations of a claim except a property or function, and the examiner cannot determine whether or not the reference inherently possesses properties which anticipate or render obvious the claimed invention but has basis for shifting the burden of proof to applicant as in *In re Fitzgerald*, 619 F.2d 67, 205 USPQ 594 (CCPA 1980). See MPEP § 2112- 2112.02.
- b. When the interpretation of the claims is or may be in dispute, i.e., given one interpretation, a rejection under 35 U.S.C. 102 is appropriate and given another interpretation, a rejection under 35 U.S.C. 103(a) is appropriate.
- c. *When the ranges disclosed in the reference and claimed by applicant overlap in scope but the reference does not contain a specific example within the claimed range. See the concurring opinion in Ex parte Lee*, 31 USPQ2d 1105 (Bd. Pat. App. & Inter. 1993). See MPEP § 2131.03.